transistor having a pair of source/drain regions, electrically connecting one of said source/drain regions with said conductive oxide electrode and electrically connecting the other of said source/drain regions with a bit line.

REMARKS

In the latest office action, the Examiner maintained the rejection of claims 1-6, 15, 22-30, 37-42, 45-49, 74-76, and 100-105 under 35 U.S.C. 102(e) as being anticipated by Kunitomo et al., U.S. Patent No. 6,235,572. While applicants previously pointed out that Kunitomo et al. do not teach oxidation of their lower electrodes, the Examiner asserts that Kunitomo et. al. teach alternative methods in which their lower electrodes may be oxidized, referring to col. 18, lines 46-62 and col. 19, lines 15-27. However, applicants first wish to point out that one skilled in the art would have to pick ruthenium oxide as the lower electrode from the disclosed list of ruthenium oxide, tungsten, titanium nitride and ruthenium. See col. 18, lines 15-17. This negates anticipation. *In re Arkley*, 172 USPQ 524 (CCPA 1972) "the reference must clearly and unequivocally disclose the claimed [invention] without any need for picking, choosing and combining various disclosures"). Further, applicants note that the only embodiment in which Kunitomo et al. teach the use of a conductive oxide (lower) electrode formed from ruthenium oxide discloses that further oxidation is restricted. See col. 21, lines 20-30.

This teaching is in direct contrast to the present invention which teaches and now claims that, during oxidation, the conductive oxide electrode is provided with enough oxygen so as to be stable with the oxide dielectric layer. See the specification at page 7, lines 23-25 and claims 1, 15, 28, 40 and 100 as amended. Claims 1-6, 15, 22-30, 37-42, 45-49, 74-76, and 100-105 are clearly patentable over Kunitomo et al.

Claims 8-12, 43-44, 50, and 57-61 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kunitomo et al. in view of Joo, U.S. Patent No. 5,879,957. While the Examiner previously asserted that Joo disclosed a method of oxidizing an upper layer electrode using gas plasma, she now states that Joo was cited only for teaching the method of forming ruthenium oxide. However, the Examiner has not addressed applicants' argument that Joo does not teach or suggest oxidizing an **upper** layer electrode as recited in claims 8, 11, 40 and 50, from which claims 9-10, 12, 43-44 and 57-61 depend. As previously pointed out, Joo teaches a

plasma oxidation method for forming a RuO layer 36 on Ru layer 35, which layers together comprise a *lower* electrode. See col. 4, lines 12-14. There is no teaching or suggestion in Joo of oxidizing an upper layer electrode under oxidizing conditions as claimed. Claims 8-12, 43-44, 50, and 57-61 are clearly patentable over Kunitomo et al. and Joo.

Claims 11-12 and 62-63 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kunitomo et al. and Joo in view of Kingon et al., U.S. Patent No. 5,555,486. The Examiner has acknowledged that neither Kunitomo nor Joo et al. teach forming a gas permeable electrode on an upper layer electrode and then oxidizing the upper layer electrode as claimed, but asserts that this order is not disclosed in the claims. However, applicants submit that this order is clear in claim 62. With regard to claim 11, the claim has been clarified to recite that the upper layer electrode is oxidized through the gas permeable electrode. See the specification at page 9, lines 18-27. Claims 11-12 and 62-63 are now believed to be clearly patentable over the cited combination of references.

For all of the above reasons, applicants submit that claims 1-6, 8-12, 15, 22-30, 37-50, 57-63, 74-76 and 100-105, as amended, are patentable over the cited art of record. Entry of this amendment and early notification of allowance is respectfully solicited.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1.(Amended) A method of forming a capacitor comprising providing a conductive oxide electrode, depositing a first layer of a high dielectric constant oxide dielectric material on said conductive oxide electrode, oxidizing said conductive oxide electrode and said first layer of said high dielectric constant oxide dielectric material under oxidizing conditions such that at least the surface of said conductive oxide electrode is provided with enough oxygen to provide stability with said first layer of high delectric constant oxide dielectric material, depositing a second layer of said high dielectric constant oxide dielectric material on said first layer of said high dielectric constant oxide dielectric material, and depositing an upper layer electrode on said second layer of said high dielectric constant oxide dielectric material.

11. (Amended) A method of forming a capacitor comprising providing a conductive oxide electrode, depositing a first layer of a high dielectric constant oxide dielectric material on said conductive oxide electrode, oxidizing said conductive oxide electrode and said first layer of said high dielectric constant oxide dielectric material under oxidizing conditions, depositing a second layer of said high dielectric constant oxide dielectric material on said first layer of said high dielectric constant oxide dielectric material, depositing an upper layer electrode on said second layer of said high dielectric constant oxide dielectric material, depositing a gas permeable electrode on said upper layer electrode, and oxidizing said upper layer electrode through said gas permeable electrode.

15.(Amended) A method of forming a capacitor comprising providing a conductive oxide electrode, depositing a first layer of a high dielectric constant oxide dielectric material comprising Ta_2O_5 on the conductive oxide electrode, oxidizing said conductive oxide electrode and said first layer of said high dielectric constant oxide dielectric material under oxidizing conditions such that at least the surface of said conductive oxide electrode is provided with enough oxygen to provide stability with said first layer of high dielectric constant oxide dielectric material, depositing a second layer of said high dielectric constant oxide dielectric material on said first layer of said high dielectric constant oxide dielectric material, oxidizing said second layer of said high dielectric constant oxide dielectric material, and depositing an upper layer electrode on said second layer of said high dielectric constant oxide dielectric material.

28. (Amended) A method of forming a capacitor comprising providing a conductive oxide electrode, depositing a first layer of a dielectric material comprising Ta_2O_5 on said conductive oxide electrode, treating said conductive oxide electrode and said dielectric material under oxidizing conditions such that both said conductive oxide electrode and dielectric material are oxidized and such that at least the surface area of said conductive oxide electrode is provided with enough oxygen to provide stability with said first layer of dielectric material, depositing a second layer of a dielectric material comprising Ta_2O_5 on said first layer of said dielectric material, oxidizing said second layer of said dielectric material, crystallizing said second layer of said dielectric material, and depositing an upper layer electrode on said second layer of said dielectric material.

40.(Amended) A method of forming a capacitor comprising providing a conductive oxide electrode selected from the group consisting of RuO_x and IrO_x, depositing a first layer of a dielectric material selected from the group consisting of Ta_2O_5 and $Ba_xSr_{(1-x)}TiO_3$ on said conductive oxide electrode, oxidizing said conductive oxide electrode and said first layer of said dielectric material with a gas plasma such that at least the surface area of said conductive oxide electrode is provided with enough oxygen to provide stability with said first layer of dielectric material, depositing a second layer of said dielectric material on said first layer of said dielectric material, depositing an upper layer electrode on said second layer of said dielectric material, and xidizing said upper layer electrode.

100.(Amended) A method of forming a DRAM cell comprising providing a conductive oxide electrode, depositing a first layer of a high dielectric constant oxide dielectric material on said conductive oxide electrode, oxidizing said conductive oxide electrode and said first layer of said high dielectric constant oxide dielectric material under oxidizing conditions such that at least the surface area of said conductive oxide electrode is provided with enough oxygen to provide stability with said first layer of high dielectric constant oxide dielectric material, depositing a second layer of said high dielectric constant oxide dielectric material on said first layer of said high dielectric constant oxide dielectric material, depositing an upper layer electrode on said second layer of said high dielectric constant oxide dielectric material, providing a field effect transistor having a pair of source/drain regions, electrically connecting one of said source/drain regions with said conductive oxide electrode and electrically connecting the other of said source/drain regions with a bit line.